



**CIRCULAR
BIOECONOMY
ALLIANCE**

Circular Bioeconomy Alliance Principles for Regenerative Landscapes

Version 1





These Principles were developed in partnership with AstraZeneca.





Introduction

[The Circular Bioeconomy Alliance](#) (CBA) was established in 2020 by His Majesty King Charles III (formerly His Royal Highness The Prince of Wales). The CBA aims to accelerate the transition to a **circular bioeconomy*** that is climate neutral, inclusive and prospers in harmony with nature. It provides knowledge-informed support as well as a learning and networking platform to connect the dots between investors, companies, governmental and non-governmental organizations and local communities to advance the [circular bioeconomy](#) while restoring [biodiversity](#) globally.

As one of its core activities CBA is establishing a global network of **Living Labs for Nature, People and Planet**, that demonstrate by action on the ground how harmony can be achieved between nature and people in concrete landscape contexts. CBA Living Labs aim at empowering local communities by integrating traditional knowledge, and by capitalizing on research and innovation in public-private partnerships. For each Living Lab, a nature-based [landscape](#) regenerative project is the starting point to catalyse the development of circular bioeconomy value chains, while restoring biodiversity, mitigating and adapting to climate change, and improving local livelihoods. They are the start of a journey towards sustainable and resilient communities and landscapes.

For the purpose of inspiring, selecting, implementing and assessing CBA Living Labs, as well as any CBA-related efforts, projects and funds to scale up landscape regenerative globally, there was a need to develop CBA-specific [regenerative](#) principles. The resulting principles called **CBA Principles for Regenerative Landscapes** have been informed by the state of knowledge on transition to a more sustainable and resilient [social-ecological](#) system. In a later stage, these principles will form the basis for a CBA standard of criteria and indicators, which allows evaluation of compliance with the CBA principles. The CBA anticipates awarding the [Terra Carta Seal](#) as a recognition of excellence for land regenerative projects complying with this standard.

* This and several other technical terms in this text are defined in the Glossary (Box 1)

Background

The CBA principles are embedded in the fundamental goal of the CBA, which is to foster a transition to a circular bioeconomy supporting biodiversity and human well-being. In a 10-point action plan, the CBA sketched the pathway of such transition around six transformative action points (1-6) and four enabling action points (7-10), which mutually reinforce each other and need to be implemented in an integrated manner: 1. Focus on sustainable wellbeing; 2. Invest in nature and its biodiversity; 3. Generate an equitable distribution of prosperity; 4. Rethink land use, food and health systems holistically; 5. Transform industrial sectors; 6. Reimagine cities through ecological lenses; 7. Create an enabling regulatory framework; 8. Deliver mission-oriented innovation to the investment and political agendas; 9. Enable access to finance and enhance risk-taking capacity; and 10. Intensify and broaden research and education (Palahí et al. 2020).

The action points above provide the conceptual framework to develop a set of CBA principles to assess landscape [restoration](#) initiatives, according to their **sustainability, resilience and local context**, aiming at the **creation of regenerative landscapes** (Figure 1). [Regenerative](#) is a term that recently emerged in the context of agriculture (Rhodes 2017). It refers to the idea that restoration should go beyond the status quo of sustainability and work towards the regeneration of a truly resilient system in a particular context.

Such new set of principles is needed because despite a number of frameworks specifically focussing on restoration (cf. FAO et al. 2021; di Sacco 2021), most of them, include a more or less arbitrary selection of sustainability and resilience principles. Furthermore, they fail to capture the multidimensional nature of the CBA approach: creating interdependent landscapes and circular bioeconomy value chains that are sustainable, resilient and in harmony with a specific context.

Therefore, we present a new coherent set of sustainability and resilience principles that put strong focus on the landscape context. We call them **CBA Principles for Regenerative Landscapes**.

Landscape regeneration

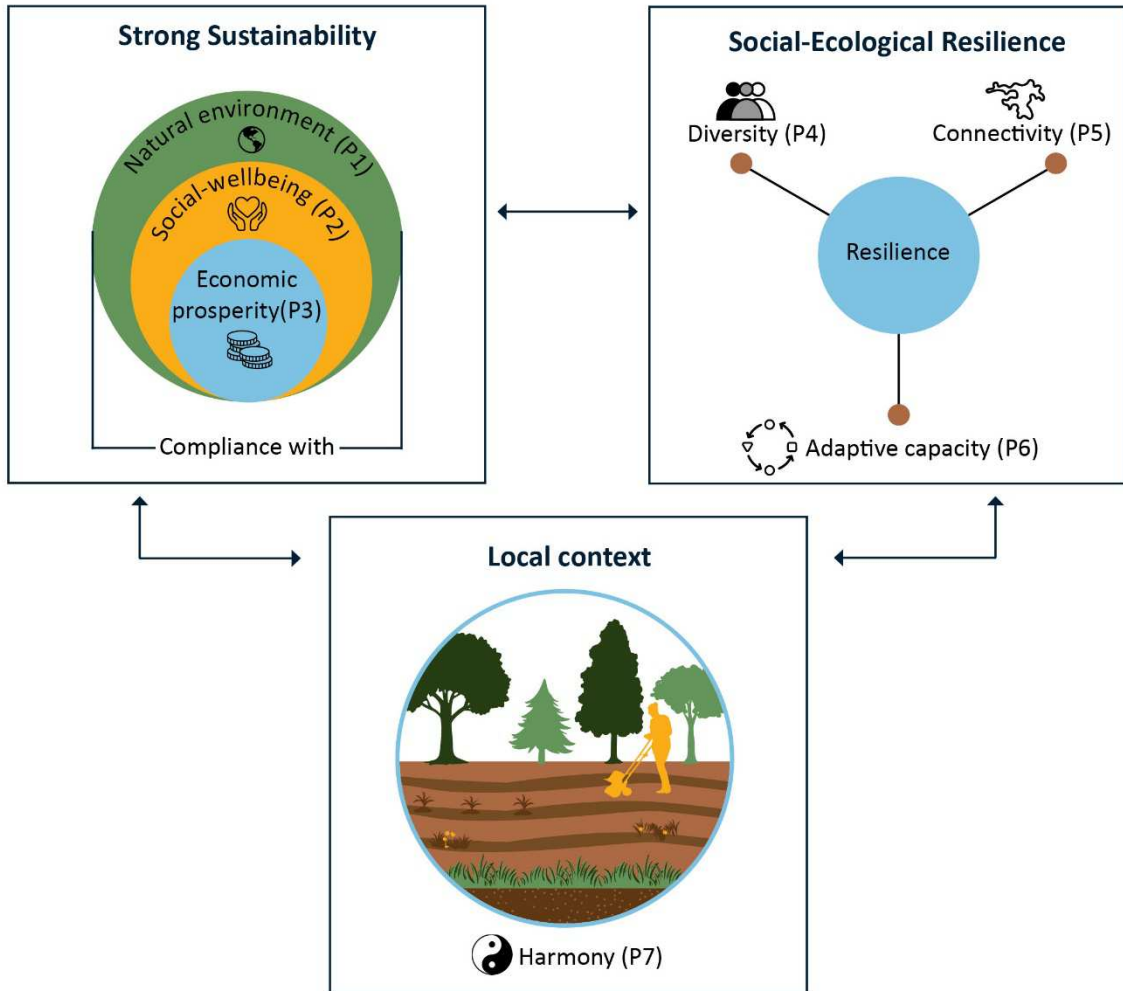


Figure 1: The CBA principles for regenerative landscapes find their origin in strong sustainability, social-ecological resilience and harnessing local context as the conceptual basis for landscape regeneration.

The CBA principles for regenerative landscapes

The CBA set of principles for regenerative landscapes consists of **7 principles**, composed of **3 sustainability** principles, **3 resilience** principles and **1 local context** principle.

- **Sustainability** is assessed via three principles focussing at the impacts on (i) **nature and the environment**; (ii) **social wellbeing** and (iii) **economic prosperity** of the landscapes and value chains created.
- **Resilience** is assessed via three principles, being (iv) **diversity**, (v) **connectivity** and (vi) **adaptive capacity**.
- **Local context** is assessed using one principle, being (vii) **harmony**.

Every principle is presented with a title (in bold), the principle formulation itself (in italic) and an explanation (in plain text). Principles have been carefully selected to cover all issues, avoid redundancy, and allow checking of compliance with measurable criteria and indicators.

This standard is meant as a source of inspiration during all phases of a **regenerative project**, from design and planning to implementation and evaluation.

Defining the principles



Principle 1. Natural environment – *Design for environmental sustainability, reverse Nature’s degradation and support ecosystem health.*

The first principle emphasizes the need to design and implement regenerative projects and value chains that support the health of the natural environment. This implies the regenerative project will include renewable bio-based production, minimizing harmful fertilizers and pesticides, avoiding eutrophication, land degradation deforestation and fragmentation of ecosystems, and protecting biodiversity. It also requires safeguards to avoid leakage, indirect land-use change, and greenwashing.



Principle 2. Social well-being – *Inclusive design aiming for equity, human health and happiness.*

Regenerative projects should play a pivotal role in creating socially inclusive landscapes and value chains that promote well-being. A regenerative project should advance equity among its stakeholder groups, including gender equality and indigenous people’s rights, to ensure that benefits from regenerative do not accrue to a small elite, or conversely that costs of regenerating land are not borne disproportionately by the powerless. Effective governance arrangements and conflict management will be key for



long-term social sustainability. This principle promotes co-design and co-creation of diverse business models.



Principle 3. Economic prosperity – *Design in support of the circular bioeconomy and target sustainable creation of wealth.*

In a concept of [strong sustainability](#) economic prosperity thrives at the service of human well-being, but always operates within the boundaries required to secure the health of the natural environment. Regenerative projects should be supported by sustainable business models and value chains generating long-term stable income from NCPs to enhance the prosperity and economic stability of local communities. Bioeconomy activities strive for fast phasing-out of fossil resources, promote the sustainable sourcing of renewable resources including food, feed, fibre and fuels, and may foster novel financial and governance instruments related to safeguarding climate, biodiversity and water, or generating value from recreational, spiritual or health-related services.



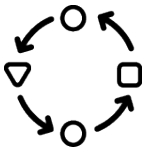
Principle 4. Diversity – *Manage risks by diversifying species, products and markets.*

Regenerative projects should enhance social and ecological diversity. Diversity is a key property of social-ecological systems that ensures system performance, insurance against risks and multifunctionality. In the face of rapid environmental change, increasing biological diversity, as well as the diversity of products and markets provides a portfolio effect that reduces the risk of system failure. In other words, diversity supports resilience. This includes value chains that rely on a large variety of green commodities and other ecosystem services, such as food, wood construction, biomaterials, biopharmaceuticals, bioenergy, biochemicals, nature tourism and water supply.



Principle 5. Connectivity – *Promote connectivity and collective impacts among nature and people.*

Regenerative projects must promote connectivity and collective impacts among nature and people. Social-ecological systems develop their complexity and stability thanks to strong connectivity and information exchange. Restoring connectivity will imply safeguarding larger natural areas, set-aside conservation corridors, and investing in ecological defragmentation. Restoring connectivity should also to promote interactions and build bonds between and within communities across regenerated landscapes.



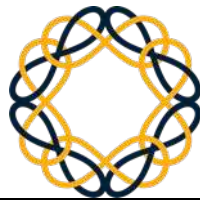
Principle 6. Adaptive capacity– *Act for the long term based on monitoring and learning, keeping the social-ecological system flexible and adapted to upcoming challenges.*

Regenerative projects should build resilience and adaptive capacity of the social-ecological system. Heavily connected systems have also a risk of becoming more vulnerable. To ensure lasting success, a regenerated landscape should gain resilience to future shocks and change. This requires anticipatory action based on learning and adaptive behaviour. Continual learning and innovating enable adaptive capacity and involves capturing and sharing lessons learned from successes and failures locally and elsewhere. It also entails assimilating information from baseline assessment and holistic monitoring, and exploring how to deal with risk and uncertainty in an informed way. Building adaptive capacity involves empowering local decision-making authorities and right-holders, to ensure that they are able to take optimal decisions on the land use that directly affects them. Adaptive behaviour will require training to tackle unlikely events in strategic, tactical, and operational planning.



Principle 7. Harmony – *Understand and embrace the local context, respecting laws and customary rights, including traditional knowledge, and finding balance between interests.*

A regenerative project aims for harmonious solutions by evaluating the project's integration into the local context, compliance with laws and customary rights, consideration of local knowledge and traditions, and finding balance and synergies in conflicts between nature and humans or ecosystem services trade-offs. It is crucial for regeneration projects to initiate and support institutional and regulatory changes that promote sustainability and resilience, while also respecting all applicable laws, international treaties, and agreements of the relevant jurisdictions. To ensure the success of regeneration efforts, a deep understanding of local ecological, socio-economic, and political conditions is essential. This includes considerations such as suitable site selection, species adaptation to regeneration objectives and anticipated climate changes, existing governance structures, ongoing or potential land tenure conflicts, and the risk profile for extreme events.



Box 1: Glossary

Adaptation / Adaptive: Adaptation is the process of adapting to changing environmental, socio-economic or political conditions. Adaptability or adaptive capacity is having the ability and flexibility to adapt to changing conditions (Folke et al. 2010).

Biodiversity: Biological diversity at different scale levels from the level of the gene to the level of the ecosystems, as well as interactions within and among species and habitats. Biodiversity is both a heritage and an asset supporting the productivity and stability of ecosystems. It is a property of nature that secures the flow of all Nature's Contribution to People. As such, biodiversity loss is considered one of the major threats to humanity (Diaz et al., 2018).

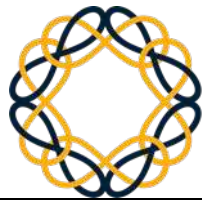
Circular bioeconomy: The circular bioeconomy relies on healthy, biodiverse and resilient ecosystems and aims to provide sustainable wellbeing for society at large. This is achieved through the provision of ecosystem services and the sustainable management of biological resources (plants, animals, micro-organisms and derived biomass, including organic waste) and its circular transformation in food, feed, energy and biomaterials within the ecological boundaries of the ecosystems that it relies on (Palahí et al. 2020).

Landscape: an area of land that is home to a social-ecological system consisting of nature, humans and their land uses. Landscapes are strongly interlinked with each other and with aquatic including marine systems, altogether forming interactive wholescapes.

Nature's Contributions to People (NCP): All contributions of nature to the quality of life for people. Beneficial contributions from nature include food provision, water purification, flood control, and artistic inspiration, whereas detrimental contributions include disease transmission and predation that damages people or their assets. NCP may be perceived as benefits or detriments depending on the cultural, temporal or spatial context (IPBES 2019).

Regenerative / Regenerative: Regenerative is a net positive process of restoring, improving and revitalizing previously degraded or over-intensified land use systems. It refers to sustainable and resilient social-ecological systems with some level of self-regulation, net-zero climate forcing and strong adaptive capacities (modified after Rhodes 2017). Regenerative projects are contributors to regenerative landscapes.

Resilience / Social-Ecological Resilience: Resilience has different meanings, e.g. the rate of bouncing back after disturbance. Social-ecological resilience is the broadest resilience concept defined as the ability of a social-ecological system to prepare and adapt to change (after Folke et al. 2010; Nikinmaa et al. 2020; Nikinmaa et al. 2023).



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Restoration: The process of reclaiming and healing ecosystems, resulting in recovery of vital ecosystem functions and valuable ecosystem services.

Social-Ecological System: a complex living system where human communities co-exist with ecosystems and their biodiversity. Conceptually, it implies a mindset avoiding too strict separation between nature and human society.

Sustainable development / Strong sustainability: Sustainable development is progress in human prosperity and well-being without causing substantial loss of ecosystem structure and function (Muys 2013). Strong sustainability is an interpretation of sustainable development where the economy remains at the support of human well-being and within planetary boundaries (Griggs et al. 2013).

References

- Díaz S., Pascual U., Stenseke M., Martín-López B., Watson R.T., Molnár Z., Hill R., Chan K.M.A., Baste I.A., Brauman K.A., Polasky S., Church A., Lonsdale M., Larigauderie A., Leadley P.W., van Oudenhoven A.P.E., van der Plaats F., Schröter M., Lavorel S., Aumeeruddy-Thomas Y., Bukvareva E., Davies K., Demissew S., Erpul G., Failler P., Guerra C.A., Hewitt C.L., Keune H., Lindley S., Shirayama Y., 2018. Assessing nature's contributions to people: Recognizing culture, and diverse sources of knowledge, can improve assessments. *Science*, 359(6373), 270–272.
- Di Sacco, A., Hardwick, K.A., Blakesley, D., Brancalion, P.H., Breman, E., Cecilio Rebola, L., Chomba, S., Dixon, K., Elliott, S., Ruyonga, G., Shaw, K., Smith, P., Smith R.J., Antonelli, A., 2021. Ten golden rules for reforestation to optimize carbon sequestration, biodiversity recovery and livelihood benefits. *Global Change Biology*, 27(7), 1328-1348.
- FAO, IUCN CEM, and SER. 2021. Principles for Ecosystem Restoration to Guide the United Nations Decade 2021–2030. Rome.
- Folke, C., Carpenter, S.R., Walker, B., Scheffer, M., Chapin, T. and Rockström, J., 2010. Resilience thinking: integrating resilience, adaptability and transformability. *Ecology and society*, 15(4).
- Griggs, D., Stafford-Smith M., Gaffney O., Rockström J., Öhman M.C., Shyamsundar P., Steffen W., Glaser G., Kanie N., Noble I., 2013. Sustainable development goals for people and planet. *Nature* 495, 7441, 305-307.
- IPBES, 2019. Global Assessment Report on Biodiversity and Ecosystem Services.
- Muys, B., 2013. Sustainable development within planetary boundaries: a functional revision of the definition based on the thermodynamics of complex social-ecological systems. *Challenges in Sustainability*, 1(1), 41-52.
- Nikinmaa, L., Lindner, M., Cantarello, E., Jump, A. S., Seidl, R., Winkel, G., Muys, B. (2020). Reviewing the use of resilience concepts in forest sciences. *Current Forestry Reports*, 6, 61-80.
- Nikinmaa L, Lindner M, Cantarello E, Gardiner B, Bredahl Jacobsen J, Jump AS, Parra C, Plieninger T, Schuck A, Seidl R, Timberlake T, Waring K, Winkel G, Muys B, 2023. A balancing act: principles, criteria and indicator framework to operationalize social-ecological resilience of forests. *Journal of Environmental Management*, 331, 117039.
- Palahí M, Pansar M, Costanza R, Kubiszewski I, Potočník J, Stuchtey M, Nasi R, Lovins H, Giovannini E, Fioramonti L, Dixson-Declève S, McGlade J, Pickett K, Wilkinson R, Holmgren J, Wallis S, Ramage M, Berndes G, Akinnifesi F, Safonov G, Nobre A, Nobre C,



Muys B, Trebeck K, Vala Ragnarsdóttir K, Ibañez D, Wijkman A, Snape J, Bas L 2020. Investing in Nature to Transform the Post COVID-19 Economy: A 10-point Action Plan to create a circular bioeconomy devoted to sustainable wellbeing. *The Solutions Journal* 11, 2.

Rhodes, C.J., 2017. The imperative for regenerative agriculture. *Science progress*, 100(1), pp.80-129.

Sayer, J., Terry, S., Jaboury, G., Jean, L. P., Douglas, S., Erik, M., Michelle, V., Agni B. Michael. D., Claude, G., Cora v. O., Louise, B. (2013). Ten principles for a landscape approach to reconciling agriculture, conservation, and other competing land uses. *Proc. Natl. Acad. Sci. USA* 110 (21), 8349–8356.